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TRANSLATION (BM-189):

**Translated Text of WO 2005/047,629 A1 (PCT/EP2004/005473)  
with Amended Pages and Claims Incorporated Therein**

**EXTERNAL DOOR HANDLE, ESPECIALLY FOR MOTOR VEHICLES**

The invention pertains to an external door handle of the type indicated in the introductory clause of Claim 1. The term "external door handle" is to be understood in the following as the entire structural unit which is attached externally to the door and in the door. This structural unit comprises a bracket, which is mounted permanently in the door, and a grip, which is supported pivotably on this bracket on the outside surface of the door. A cover part, into which a lock cylinder and other functional parts can be integrated as needed, can be provided next to the grip. The lock cylinder, the functional parts, and the cover part are also fastened to the bracket.

To increase operating convenience, it is known (DE 196 17 938 C2) that a capacitive sensor can be provided in a locking device of a motor vehicle. This sensor is integrated into the grip of the external door handle. If the request for authorization is satisfied, this capacitive sensor serves to actuate the locking device and thus grants access to the vehicle. In this known device, the authorized person has an

identification transmitter (ID transmitter). When this person's hand approaches the grip, the capacitance of the capacitative sensor changes, and a signal is conveyed to the electronic control system in the vehicle. This system then uses a send-and-receive device to initiate a search procedure for the ID transmitter, and data communications begin between the ID transmitter and the electronic control system. The ID transmitter transmits an identification code, which is received by a code receiver in the vehicle and evaluated by an electronic control unit. If the code comparison is positive, the locking device will grant access to the vehicle. So that the code signal can be transmitted, the sensor present inside the grip must be connected to the electronic control system in the vehicle by electrical lines and plug connections. The electrical plug connection has a connector part, which is assigned to the grip, and an opposing connector part, which is seated on the cable coming from the bracket. The disadvantage of this known external door handle is that electrical cable and plug connections are required between the capacitative sensor and the electronic control unit. This restricts the design freedom with respect to the arrangement of the capacitative sensor, and in particular a great deal of work is required to

connect the electrical plug connections. A large number of components is also required.

It is known from DE 101 53 142 C1 that a capacitative sensor with two external electrodes acting in the outside area can be integrated into a detachable housing unit, which, if needed, can be mounted on the bracket. Each of the external electrodes has a separate sensor surface, one of which is used to trigger the unlocking, the other to trigger the locking of the lock. So that the sensor surfaces can be located at the desired points in the external door handle, the housing of the housing unit must have an appropriately subdivided, angled design. This restricts the design freedom with respect to the installation of the sensor surfaces, because these points must always be readily accessible.

To improve the sensitivity of a capacitative contact sensor in a grip, FR 2 828 225 A1 proposes that an electrical conductor be connected to the contact sensor, this conductor extending to the metallic surface of the grip. The connection between the capacitative sensor and the metallic strip is accomplished by a capacitative coupling field between two electrodes, which are mounted permanently in the interior of the grip. Electrical lines or circuit boards must be installed in the interior of the

grip to supply the operating voltages and to an carry away the measurement voltages. The lines must be brought into electrical contact with other lines in the bracket. The same problems occur here as in the case of the previously cited state of the art.

Although it is known from EP 0 999 324 A2 that a grip, which contains a capacitative sensor, can be kept free of capacitance sensor circuitry, this is done by the use of electrical slide contacting. The electrode in the grip is guided across an electrical conductor leading to the area of the pivot bearing. This conductor makes sliding contact with the bracket-side electronic sensor circuit. To guarantee that this sliding contact occurs properly, the bracket-side conductor must exert a sufficient amount of pressure. Contact problems can thus occur. As a result of corrosion of the areas which come in contact with each other, the quality of the sliding contact can deteriorate over the course of time.

FR 2 833 986 A1 does not have a first electrode in the grip which moves concomitantly with the grip. Instead, it is known that both a measuring electrode and a reference electrode can be installed permanently in the bracket, where they are connected to a capacitative electronic sensor circuit. Between the two

electrodes there is created a monitoring zone for the user's hand, which is used to grasp the handle. Through the use of an additional metallic conductor on the grip, capacitative coupling with the measuring electrode is produced, which causes the monitoring zone to change in a favorable manner. This coupling does not serve here to create a capacitative connection between the electronic sensor circuit in the bracket and a capacitative sensor in the grip. The grip in this external door handle does not have a hand-sensing electrode, which generates an electrical field in the outside area.

The invention is based on the task of developing an inexpensive external door handle of the type indicated in the introductory clause of Claim 1 with a reliably effective sensor surface. This is achieved according to the invention by the measures cited in Claim 1, to which the following special meaning attaches.

In the invention, there are at least three different electrodes, two of which are mounted in the grip. The first electrode, as in the case of the state of the art cited above, is located in the grip and generates an electrical field in the outside area of the external door handle, which senses the approach of an authorized person to the handle or the contact of

that person's hand with the handle. The active surface of this first electrode is therefore called the "sensor surface". The second electrode, however, is located in the bracket, where it is connected directly to the electronic control circuit. The electronic control circuit allows an electrical coupling field to build up at the active surface of this second electrode. This field acts only in the interior area of the door handle. The active surface of the second electrode is therefore called the "exciter surface" for the coupling field. In addition to the first electrode, the grip also has a third electrode, which is connected to the second electrode. The coupling field generated by the second electrode acts on the active surface of the third electrode, for which reason this third active surface is called the "transfer surface" for the coupling field. It is true that, when the grip is manually pivoted, the exciter surface of the second electrode remains stationary in the bracket, but the transfer surface of the third electrode moves concomitantly with the grip. The coupling field between the exciter surface and the transfer surface is optimal when the grip is in its resting position, because then the second and third electrodes occupy the most favorable positions with respect to each other.

The sensor surface and the transfer surface can be connected to each other electrically. For this purpose, the first, moving electrode carrying the sensor surface can be produced together with the second, moving electrode carrying the transfer surface as a single part. A one-piece component of this type with two electrodes and the electrically conductive connection between them can be very easily integrated into the grip when the grip is produced. This can be done by stacking, injection-molding, or by the deposition of electrically conductive layers or tracks.

Additional measures and advantages of the invention can be derived from the subclaims, from the following description, and from the drawings. The drawings illustrate several exemplary embodiments of the invention in schematic fashion:

-- Figure 1 shows a longitudinal cross section through a first exemplary embodiment of an external door handle mounted on a door;

-- Figure 2 shows a second exemplary embodiment of an external door handle of a design similar to that shown in Figure 1;

-- Figure 3 shows part of a third exemplary embodiment, representing a variant of Figure 2; and

-- Figure 4 shows a fourth exemplary embodiment, which in principle uses the designs of Figures 1 and 2 simultaneously.

In the interior 11 of the door, a bracket 10 is attached to the inward-facing 12 of the external skin 13 of the door. On the exterior surface 14 of the external door skin 13 is a grip 20, which is designed here as a pull-type grip. One end 21 of the grip is supported pivotably on the bracket 10 at 15, whereas the other end 22 carries an arm 23. The arm 23 is in the form of a hook, which cooperates with a working element 16, which belongs to a lock (not shown) in the door.

The lock can be switched between a locking position, in which actuation of the grip 20 to open the door is nonfunctional, and an unlocked position, in which actuation of the grip 20 in the direction of the arrow 24 is functional in terms of the lock and thus opens the lock. The actuating position of the grip is illustrated in broken line in the drawing and designated by the symbol 20'. The working element thus arrives in its working position, shown in broken line and designated by the symbol 16'.

Next to the grip 20 is a cover part 25, which is seated on the exterior side of the external door skin 13 and which conforms to the external profile of the grip 20. This cover



part is advisably fastened to the bracket 10. In the present case, a locking cylinder barrel 17 is also fastened to the bracket 10, the output end 18 of which cooperates with the lock. A key (not shown) is able to access the exterior end surface 19 of the locking cylinder barrel 17 in the area of the cover part 25. This locking cylinder barrel 17 is usually used only in an emergency, i.e., when the electronic control system in the vehicle has failed. In many applications, the locking cylinder 17 can be omitted entirely and replaced by a dummy barrel.

A separate housing unit 30 is attached to the inward-facing 26 of the bracket 10; this unit is divided into a main housing 31 and a projecting housing "finger" 32. A first sensor surface 27 of a capacitative proximity or contact sensor is located on the free end 33 of the finger. This sensor acts in the outside area of the external door handle, and its electronic components, such as those indicated in broken line at 28, are integrated into the interior of the main housing 31. This sensor surface 27 serves to trigger the locking of the lock. Instead of the sensor surface 27, it would also be possible to use a contact switch or a pushbutton switch. When a person carrying proper access authorization brings his hand close to the sensor surface 27, the process by which the lock is locked is initiated. It is

therefore favorable for the end 33 of the finger to be as close as possible to the cover part 25. For this purpose, both the bracket 10 and the exterior door skin 13 are provided with an opening 29 in this area. The arm 23 of the pull-type grip 20 also passes through this opening 29.

The grip 20 is preferably provided with a cavity 42, in the interior of which an electrode acting in the outside area of the external door handle is installed and therefore remains protected. The active sensor surface of this electrode is designated 37. This sensor surface 37 also belongs to the capacitative sensor, but it serves to trigger the unlocking of the lock. At in the inner end of the arm 23 and in the area of the housing finger 32, two inner electrodes are provided, the active surfaces of which are designated 35, 36. When the grip 20 is in the resting position, as shown in the drawing, a small gap 39 remains between the two active surfaces 35, 36. The housing-side active surface 35 is connected to the electrical components 37 of the grip-side sensor electrode 37 by the electrical wiring 44, only partially illustrated, passing through the housing 30 and cooperates with the other electrode located in the arm 23 to build up the previously mentioned electrical coupling field 50.1 in the gap 39. This coupling

field 50.1 is indicated by dots in Figure 1. For this reason, the active surface 35 of the first inner electrode, i.e., the electrode on the housing side, is called the "exciter surface", and the active surface of the other inner electrode in the arm 23 is called the "transfer surface". This transfer surface 36 is connected for its own part by a fixed electrical conductor 34 to the sensor surface 37 integrated into the grip 20. The electrode with the sensor surface 37, the electrode with the transfer surface 36, and the electrical line 34 between them can be designed to form a single piece and integrated into the grip when the grip is produced by a technique such as injection-molding or the like. The same voltages and voltage profiles which are built up at the exciter surface 35 cross the field bridge present in the gap 39 and propagate to the sensor surface 37. Conversely, changes in the electrical field in the area of the sensor surface 37 are conducted via the two free contactless active surfaces 36, 35 to the associated electronic sensor circuit 38 in the bracket 10. The electrical coupling field 50.1, in electrical terms, is connected in series with the external field acting in the area outside the sensor surface 37.

The signals received by the electronic sensor circuit 38 are sent via an electrical plug connection 40 and a cable 41 to

an electronic control unit in the vehicle. The control unit then transmits a control pulse, which unlocks the lock in this particular door. If a central locking function is present in the vehicle, all the other doors and hatches of the vehicle are unlocked also.

It is obvious that the exciter and transfer surfaces 35, 36 can be positioned elsewhere on the grip 20 and on the bracket 10. The housing unit 30 could also be located in some other area of the bracket, e.g., in the area of the previously mentioned locking cylinder 17 or dummy barrel provided there. Instead of the two inner electrodes, contacts could also be provided, which are in contact with each other in the resting state and are thus able to transmit the various voltages and signals. The use of the previously described contactless inner electrodes, however, offers the advantage that production tolerances with respect to the gap between the exciter surface 35 serving to build up the coupling field 50.1 and the transfer surface 36 can be easily accommodated. The door lock can also be unlocked by way of the sensor surface 37 even while the grip 20 is in the resting position.

As previously mentioned, Figures 2, 3, and 4 show three other variants of the inventive external door handle. Similar

parts are designated by the same reference numbers as those used in Figure 1. To this extent, the previous description also applies here. It is sufficient, therefore, to discuss only the differences.

In Figure 2, an external electrode with its sensor surface 47 acting in the outside area of the external door handle is located in the cover part 25, which holds the previously mentioned locking cylinder 17 or a dummy cylinder. Two inner electrodes in the external door handle are assigned here, too, to this sensor surface 47. The exciter surface 45 of the one electrode and the transfer surface 46 of the other electrode generate between them an electrical coupling field 50.2, which is emphasized in Figure 2 by the dotted shading. The sensor surface 47 and the transfer surface 46 are permanently connected to each other by an electrical conductor 49. These components can also be produced as a single part, where the sensor surface 47 and the transfer surface 46 are formed by the end surfaces of the conductor.

The other inner electrode, i.e., the one with the exciter surface 45, is provided with an electrically conductive extension 48, which leads to the housing 31 of the previously described structural unit 30 and is connected there to the

associated electronic sensor circuit 38. In this case as well, the structural unit 30, which contains the electronic sensor circuits 28, 38, is attached to the inward-facing 26 of the bracket 10. This is done from the inside of the door.

In Figure 2, the sensor surface 47 is located at the inside surface of the cover part 25. In front of the sensor surface 47 is the wall 51 of the cover part 25, which can be provided here with its full thickness. Figure 3 shows an alternative to this.

In Figure 3, the wall 51 of the cover part 25 can be made thinner. The key difference from Figure 2, however, is that, on the outside surface 53, the cover part 25 carries a layer 52 of electrically conductive paint, at least in a defined area, the outside surface of which again creates the sensor surface 57, which acts in the outside area of the external door handle. In Figure 3, the second inner electrode with its exciter surface 55, as described previously in conjunction with Figure 2, is present in the small free gap behind the inside surface of the wall 51. This electrode again has an extension 54. The extension 54 again leads to the housing of the structural unit (not shown).

In Figure 4, as previously mentioned, a modification of the measures of Figure 1 are used simultaneously with the measures of Figure 2. To that extent, the description given so far also

applies here. Here, two different sensor surfaces 47, 67, which trigger different functions in the vehicle when an authorized person approaches or touches them, act in the outside area of the external door handle. As already explained in conjunction with Figure 2, the sensor surface 47 serves to lock the lock integrated into the door. The other sensor surface 67, however, as in Figure 1, serves to unlock the lock. This embodiment differs from that of Figure 1, however, in the following ways.

The extension 48 of the electrode belonging to the exciter surface 45 of the coupling field 50.2 is isolated from the other electrode 58. The two extensions 48, 58 lead to the housing 31 of the structural unit 30. At the outer end of the electrode 58, there is again an exciter surface 59, which creates another electrical coupling field 50.4 in the external door handle of Figure 4. In this case, too, the transfer surface 56 of an opposite inner electrode, which is formed by the terminal part of a one-piece electrical conductor 60, also belongs to the electrical coupling field 50.4.

The conductor 60 is integrated into the previously described arm 23 of the grip 20, which is also designed here as a pull-type grip. At the outer end of the conductor 60 there is the previously described second sensor surface 67. The sensor

surface 67 can extend up as far as the inside surface 62 of the preferably hollow grip 20 and is protected from the outside by a wall 61 of the grip 20.

Additional sensor surfaces can be provided in the area of the grip 20, of the cover part 25, or at other points and thus separated from each other both spatially and functionally. To facilitate assembly in this case as well, inner electrodes should be assigned to at least one or more of these sensor surfaces. By way of exciter surfaces and transfer surfaces, the inner electrodes will be able to generate the electrical coupling field. Upon the approach of an authorized person or upon contact by that person, different functions in the vehicle will thus be initiated.

In addition to the previously described unlocking and locking of the lock, it would also be possible to actuate other movable parts in the vehicle in the opening direction and/or closing direction when the associated sensor surface responds. For the opening and closing of such movable parts, it is also possible to provide only a single sensor surface, which, when approached or contacted, initiates movement in one direction and, when approached or contacted again, initiates movement in the other direction. Moving parts of the vehicle can be one or



more of the windows, a sliding roof, a rear hatch, or even one or more doors of the vehicle.

The electrodes which are used to build up the coupling field can also be located anywhere in the external door handle. For example, it is possible, in analogy to Figure 4, to lengthen the electrode 58 and to let it continue next to the electrode extension 48 all the way to the interior of the cover part 25. The previously described exciter surface 59 for a coupling field similar to 50.4 of Figure 4 will then be located behind the cover part 25. The other inner electrode belonging to the sensor surface 67 with its transfer surface characterized in Figure 4 by the number 56 will in this case be located at the inside surface of the grip 20 adjacent to the cover 25. In this described alternative case, the electrical conductor 60 of Figure 4 no longer runs in the longitudinal direction of the arm 23 but rather more-or-less transversely to it.

If some other additional functions are to be initiated in the vehicle, an additional sensor surface, a certain distance away from the sensor surface 47 in the cover part 25 described in conjunction with Figures 2 and 4, can also be provided in the cover part 25. Inner electrodes will then again be assigned to this third sensor surface. As shown in Figure 2, these inner

electrodes will advisably have their electrode extension 48 outside the grip.

The electrically conductive layer 52 according to Figure 3 can also be made of elastic material such as plastic, which has been made electrically conductive. Instead of being provided on exterior surfaces, as in Figure 3, such electrically conductive layers can be provided on interior surfaces of the external door handle, e.g., in the interior of the grip 20 or of the cover 25, or of other elements located in this area. These layers can then serve not only the function of sensor surfaces but also the function of transfer surfaces and exciter surfaces for creating the coupling fields in question.

### List of Reference Numbers

- 10 bracket
- 11 interior of the door
- 12 inward-facing of 13
- 13 external skin of the door, door panel
- 14 exterior surface of 13
- 15 bearing point on 10 for 20
- 16 working element for the door lock (rest position)
- 16' working position of 16
- 17 locking cylinder
- 18 output end of 17
- 19 end surface of 17
- 20 grip, pull-type grip (resting position)
- 20' actuating position of 20
- 21 first end of 20, bearing end
- 22 second end of 20, working end
- 23 arm of 20 for 16
- 24 arrow of the actuation of 20
- 25 cover part
- 26 inward-facing of 10
- 27 first sensor surface, active surface for unlocking the lock
- 28 electronic components, electronic sensor circuit for 27

29 opening in 10 and 13  
30 structural unit for 27, 37  
31 housing, main housing of 30  
32 housing finger of 30  
33 end of finger 32  
34 electrical line between 36 and 37  
35 active surface of the first inner electrode, exciter  
surface for 50.1  
36 active surface of the second inner electrode, transfer  
surface for 50.1  
37 second sensor surface, active surface for unlocking the  
lock  
38 electrical components for 37, electronic sensor circuit  
39 gap between 35 and 36  
40 electrical plug and opposing plug  
41 cable at 40  
42 cavity in 20 for 37  
43 guide surface in 10 for 23  
44 electrical lines in 30 between 35 and 38  
45 exciter surface for 50.2 (Figure 2)  
46 transfer surface for 50.2 (Figure 2)  
47 sensor surface (Figures 2, 4)

48 extension of the electrode of 45 (Figures 2, 4)  
49 conductor between 46 and 47 (Figures 2, 4)  
50.1 coupling field (Figure 1)  
50.2 coupling field (Figure 2)  
50.3 coupling field (Figure 3)  
50.4 coupling field (Figure 4)  
51 wall of 25 (Figure 2)  
52 layer of electrically conductive paint (Figure 3)  
53 outside surface of 25 (Figure 3)  
54 extension of the electrode of 55 (Figure 3)  
55 exciter surface for 50.3 (Figure 3)  
56 transfer surface for 50.4 (Figure 4)  
57 sensor surface of 52 (Figure 3)  
58 electrode for 56 (Figure 4)  
59 exciter surface of 58 (Figure 4)  
60 electrical conductor for 56, 67 (Figure 4)  
61 wall of 20 (Figure 4)  
62 inside surface of 20 (Figure 4)  
  
67 sensor surface in 20 (Figure 4)

## CLAIMS

1. External door handle, especially for motor vehicles,
  - with a stationary bracket (10) attached to the door (11);
  - with a grip (20), supported pivotably on the bracket (10);
  - with a lock mounted in the door (11), which lock can be switched between a locked and an unlocked position;
  - where an actuation (24) of the grip (20) to open the door (11) is nonfunctional in the locked position but functional in the unlocked position; and
  - with at least one capacitative electronic sensor circuit (28, 38), which is mounted directly or indirectly on the bracket (10) and which has a first electrode, which is located in the grip (20) and is active in the outside area of the external door handle;
  - where the active surface (37) of this first electrode senses the approach of or contact by an authorized person and is therefore called the sensor surface (37); and
  - where the authorized person carries with him an active or passive means of identification for access authorization and/or driving authorization for the vehicle;

characterized in that

-- at least one second electrode, which is connected to the electronic control circuit (28, 38), is provided on the bracket (10); in that

-- the electronic sensor circuit (28, 38) builds up an electrical coupling field (50.1) at the active surface (35) of the second electrode in the interior of the external door handle, for which reason this active surface on the bracket side is called the exciter surface (35) for the coupling field (50.1); in that

-- at least one third electrode, which is connected to the sensor surface (37) of the first electrode acting in the outside area of the external door handle, is mounted on the grip (20); in that

-- the coupling field (50.1) acts on the active surface (36) of this third electrode, for which reason this active surface on the grip (20) is called the transfer surface (36) for the coupling field (50.1); and in that

-- when the grip (20) is pivoted (24), the exciter surface (35) of the second electrode in the bracket (10) remains stationary, whereas the transfer surface (36) of the third electrode moves concomitantly with the handle (20).

2. External door handle according to Claim 1, characterized in that the exciter surface (35) of the second electrode is electrically connected (44) to the capacitative sensor electrode (28, 38).

3. External door handle according to Claim 1, characterized in that the transfer surface (36) of the third electrode is electrically connected (34) to the sensor surface (37) of the first electrode, which is active in the outside area of the external door handle.

4. External door handle according to one of Claims 1-3, characterized in that a layer (52) of electrically conductive paint is applied to the exterior surfaces (53) and/or to the interior surfaces of the external door handle, at least in certain defined areas, and in that

-- this paint layer (52) produces the first electrode with its sensor surface (57), the second electrode with the transfer surface, and/or the third electrode with the exciter surface.

5. External door handle according to one of Claims 1-4, characterized in that an electrically conductive layer of elastic material is applied to the exterior surfaces and/or to the interior surfaces of the external door handle, at least in certain defined areas, and in that



-- this layer produces the first electrode with the sensor surface (57), the second electrode with the transfer surface, and/or the third electrode with the exciter surface.

6. External door handle according to one or more of Claims 1-5, characterized in that the external door handle has several separate, outward-acting sensor surfaces (67, 47) for sensing the presence of a hand and/or inward-acting transfer surfaces (56, 46) and/or exciter surfaces (59, 45) for building up the coupling field, and in that these separate sensor surfaces (67, 47), upon contact by or approach of the authorized person, trigger different functions in the lock or in other devices in the vehicle.

7. External door handle according to Claim 6, characterized in that one of the sensor surfaces (67) serves to unlock the lock, whereas another (47) serves to lock the lock.

8. External door handle according to Claim 6 or Claim 7, characterized in that, upon the approach of or contact by the authorized person, at least one of the sensor surfaces triggers the movement of movable parts in the vehicle in the opening and/or in the closing direction.

9. External door handle according to Claim 8, characterized in that the sensor surfaces cause the movable

parts to move in the opening direction upon contact by or approach of the authorized person and then in the closing direction upon the next approach or contact.

10. External door handle according to Claim 8 or Claim 9, characterized in that the movable parts are one or more windows, a sliding roof, a rear hatch, and/or one or more doors of the vehicle.

11. External door handle according to one or more of Claims 1-10, characterized in that one or more of the outward-acting sensor surfaces (37, 67) are seated on the grip (20).

12. External door handle according to one or more of Claims 1-11, characterized in that one or more of the sensor surfaces (27, 47, 57) are seated on a cover part (25), which is mounted in the external door handle next to the grip (20).

13. External door handle according to one or more of Claims 1-12, characterized in that at least some of the electronic components of the capacitative sensor which serve to lock and/or to unlock the lock and/or to move the movable parts in the vehicle are integrated into the grip or into the interior of the grip of the external door handle.

14. External door handle according to one or more of Claims 1-12, characterized in that at least some of the

electronic components (28, 38) of the capacitative sensor (electronic sensor circuit 28, 38) which serve to lock and/or to unlock the lock and/or to move the movable components in the vehicle, are mounted either directly or indirectly (30) on the bracket (11).

15. External door handle according to Claim 14, characterized in that the electronic sensor circuits (28, 38) are located in a housing unit (30), which is seated on the bracket (11).

16. External door handle according to Claim 15, characterized in that the housing unit (30) is prefabricated and can be attached to the inward-facing (26) of the bracket (11).

17. External door handle according to Claim 15 or Claim 16, characterized in that the housing unit (30) is prefabricated and is attached in the area of a barrel (17) mounted on the bracket,

-- where the barrel (17) is mounted in the bracket (11) next to the grip (20).

18. External door handle according to one of Claims 15-17, characterized in that the housing unit (30) consists of a main housing (31) and a projecting housing finger (32); and in that

-- the end (33) of the finger extends into the outer area

(25) of the external door handle, where it has an outward-acting sensor surface (27) for triggering the locking of the lock.

19. External door handle according to Claim 18, characterized in that the electronic sensor circuit (28, 38) is integrated into the main housing (31) of the housing unit (30),

-- whereas the housing finger (32) can be inserted through an opening (29) in the bracket (11) and through a hole in the outer housing skin (30) of the door.

20. External door handle according to Claim 18 or Claim 19, characterized in that the housing unit (30) can be installed on the inward-facing surface (26) of the bracket (11) mounted in the door and/or removed afterwards from the interior (11) of the door.

21. External door handle according to one or more of Claims 1-20, characterized in that the grip consists of a pull-type grip (20), which is supported (15) at one end (21) on the bracket (11), whereas its other end (22) has an arm (23), which cooperates with the lock; and in that

-- the housing finger (32) is located next to the arm (23).

22. External door handle according to Claim 21, characterized in that the transfer surface (36) of the third electrode for the electrical coupling field (50.1) is located on

the inner end of the arm (23) of the grip (20).

23. External door handle according to Claim 21 or Claim 22, characterized in that the exciter surface (35) of the second electrode for the electrical coupling field (50.1) is located in the housing unit (30), which is seated on the rear surface (26) of the bracket (11).